

The Meaning and Relevancy of Innovation and Entrepreneurship: An Exploration of Agriculture Teacher Preparation and Perspectives

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Abstract

Innovation and entrepreneurship are central components of the nation's current economic strategy and thus have direct influence over workforce competitiveness within agricultural industries and environments. In this multiple case study, the experiences and perspectives specific to these two components of 21 graduate students preparing or further preparing for careers as school-based agriculture teachers at three Land Grant universities are qualitatively explored. The study reveals how the participants generally understand innovation and entrepreneurship, as well as provides indication of how the formal, non-formal, and informal/incidental learning that takes place during graduate programs of study influence how the participants' relate the two concepts to their future roles as school-based agriculture teachers. Recommendations for including principles and concepts of innovation and entrepreneurship in graduate-level agriculture teacher preparation programs are developed.

Keywords: Entrepreneurship, Innovation, Agricultural Economy, Agricultural Workforce

Introduction and Background

The 21st century workplace and underlying knowledge-based economy demand that professionals across all industrial sectors be equipped with the skills needed to identify and capitalize on opportunities for innovation (Powell & Snellman, 2004; Wagner, 2012). Accordingly, the initiation and implementation of innovation through entrepreneurial strategies have been positioned as a national economic priority and focus of federal scientific investments (Mars, Bresonis, & Szelenyi, 2014). The federal-level priority given to innovation and entrepreneurship is evidenced throughout the nation's strategic narrative and within policy initiatives aimed at economic competitiveness and societal development. For instance, consider the following remarks made by President Barack Obama (2014) in his 2014 State of the Union address:

We know that the nation that goes all-in on innovation today will own the global economy tomorrow. This is an edge America cannot surrender. Federally-funded research helped lead to the ideas and inventions behind Google and smartphones. That's why Congress should undo the damage done by last year's cuts to basic research so we can unleash the next great American discovery – whether it's vaccines that stay ahead of drug-resistant bacteria, or paper-thin material that's stronger than steel.

This national effort to promote innovation as a lever for economic and societal progress has permeated the agendas and strategies of the major federal funding agencies. Consider, for instance, the National Science Foundation's Science and Innovation program, which aims to develop and grow an "innovation ecosystem" capable of accelerating the translation of discoveries made through the support of federal dollars into commercially viable technologies (Peterson, 2010).

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Federal investments in agricultural research are also increasingly aimed at innovation diffusion and entrepreneurial development. For example, the United States Department of Agriculture (USDA) invested \$75 million in 2014 to support the creation of “Innovation Institutes focused on emerging challenges to agriculture” (NIFA, 2014).

The strategic importance of agricultural innovation and entrepreneurship is not limited to large-scale industry that is equipped with substantial monetary resources and the human and intellectual capital necessary for the development and application of leading edge technologies. Instead, the national push for agricultural innovation and entrepreneurship also calls for entrepreneurial leaders across all professional domains of agriculture, including small- to mid-sized farming and ranching operations (Rivera & Alex, 2008). In this regard, for instance, the USDA currently maintains a Small Business Innovation Research (SBIR) program aimed at enhancing the role of smaller scale enterprises in developing and commercializing the innovations that emerge from the research the agency funds (NIFA, 2015).

Based on the preceding economic demands and policy priorities, collegiate-level agricultural education scholars have called for an increased focus on innovation and entrepreneurship diffusion within leadership and communication curricula (Mars & Torres, 2014; Mars, 2015). However, the merits of and strategies for infusing principles and concepts of innovation and entrepreneurial leadership into agriculture teacher preparation programs remain overlooked. The current study contributes to this gap in the literature through an exploration of the experiences, knowledge, and perspectives of graduate students preparing or further preparing for careers as school-based agriculture teachers relevant to innovation and entrepreneurship.

The relevancy of innovation and entrepreneurship to school-based agricultural education is reflected in the history and evolution of the field. Historically speaking, the curricular recommendations that emerged from the Smith Hughes National Vocation Education Act of 1917 positioned economics, which is a field heavily influenced by innovation and entrepreneurship, as an important component of agricultural education (True, 1929). More recently, the Committee on Agricultural Education in Secondary Schools (CAESS) contended in 1988 that agricultural education should work to transcend its conventional boundaries in order to be more equipped to respond to the diversifying needs of agricultural industry, which today largely center on innovation and entrepreneurship (Aldrich, 1988). Additionally, “entrepreneurship and ownership” is now included as one of the six supervised agricultural experiences (SAE’s) that the FFA recommends be included in school-based agricultural education programs (FFA, 2015). Innovation has not, however, been widely adopted as a hallmark of SAE’s (Hanagriff, Murphy, Roberts, Briers, & Lindner, 2010; Retallick, 2010), which is especially problematic with the “entrepreneurship and ownership” program considering innovation is a constant, fundamental principle of the entrepreneurial process (Drucker, 2001).

Purpose Statement

Agriculture teachers serve as a conduit between students and an agricultural economy that increasingly turns on innovation diffusion and entrepreneurial development. As such, the training and preparation of agriculture teachers in the context of the current era of innovation and entrepreneurship warrants scholarly attention. The first purpose of this multiple case study is to qualitatively explore how graduate students preparing to be agriculture teachers, or further preparing in the case of students who returned to graduate school after having some teaching experience, understand the meaning and relevancy of innovation and entrepreneurship within contemporary agricultural settings and environments. The second purpose is to understand how, if at all, graduate students preparing to be agriculture teachers view innovation and entrepreneurship in the context of their future instructional careers and capacities to prepare students for success within the contemporary agricultural economy. The third purpose of the study is to reveal how, if

at all, graduate-level agriculture teacher preparation programs shape student perspectives on innovation and entrepreneurship in relation to their future teaching careers. With these purposes in mind, the following three questions guide the study:

1. How do graduate students preparing or further preparing to be agriculture teachers understand the meaning and relevancy of innovation and entrepreneurship within contemporary agricultural settings?
2. How, if at all, do graduate students preparing or further preparing to be agriculture teachers view the potential impacts of innovation and entrepreneurship on their future instructional perspectives and/or practices?
3. How, if at all, are graduate students preparing or further preparing to be agriculture teachers introduced to the concepts of innovation and entrepreneurship during their graduate programs of study?

Conceptual Framework

The framework that guides this study is twofold. First, definitions of *innovation* and *entrepreneurship* are established from the scholarly literature and to then be applied to the analysis and contextualization of the data relevant to the first research question. Second, a framework composed of constructs specific to formal, non-formal, informal, and incidental learning is developed to guide the analysis of the data in relation to the second and third research questions.

Innovation and Entrepreneurship

Innovation and entrepreneurship are primary characteristics of the currently dominant knowledge-based economy (Powell & Snellman, 2004). While ubiquitous in use, the meanings of both concepts are often left vague, overly simplified, and underdeveloped. Here, the concepts of innovation and entrepreneurship are individually defined and contextually framed according to the economic, management, and sociology literatures.

Innovation is defined as a novel product or process that generates economic value and/or creates social impact when implemented within relevant communities, markets, and/or organizational settings (Baregheh, Rowley, & Sambrook, 2009; Drucker, 2001; Phills, Deiglmeier, & Miller, 2008). The development of businesses and other organizational-types may or may not involve innovation. However, entrepreneurial ventures inherently center on innovation (Drucker, 2001; Hebert & Link, 1989). In this regard, *entrepreneurship* is understood to be the strategic process intended to mobilize and allocate the resources and develop the organizational structures (e.g., for-profit business, non-profit organization, entrepreneurial unit within an existing business or organization) needed to advance innovation. The desired outcome of this inherently innovative and thereby disruptive process is the generation of economic value and/or the creation of community and societal impact (Schumpeter, 1934, 1942).

The pressures of the knowledge-based economy influence to varying degrees every professional and industrial sector, as well as economies of all levels (i.e., local, regional, national, global) (Porter, 2000). Accordingly, school-based agriculture teachers should be prepared and equipped to foster in their students the capacities to be innovators and entrepreneurial leaders irrespective of academic and career interests and trajectories. In the current study, the experiences and perspectives of the participants specific to innovation and entrepreneurship are compared to the preceding definitions of and relational dynamic between innovation and entrepreneurship. By doing so, new insights on the capacities of school-based agriculture teachers to prepare students for competitive opportunities within the knowledge-based economy are captured.

Graduate Training Learning Environments

This exploration of how graduate students preparing or further preparing for careers as school-based agriculture teachers come to understand the meaning of innovation and entrepreneurship and begin to contextualize both concepts in relation to agricultural education is guided by the concepts of formal, non-formal, informal, and incidental learning. These four categories provide the opportunity to delve into the various ways in which agriculture teachers are introduced to the principles of innovation and entrepreneurship throughout their training, as well as how these principles may influence their own future practices as teachers who aim to prepare students both academically and professionally.

Formal learning takes place within the conventional classroom and through the development and delivery of planned curricula that is guided by pre-determined learning objectives and measures of performance (i.e., grades) (Eshach, 2007; Etling, 1993). The inclusion of coursework within formal curricula implies legitimacy and is therefore likely to be viewed by faculty and students as being a vital component of student learning and training. Accordingly, formal curricula provides insight into how, if at all, agricultural education graduate students are developing an understanding of the meaning of innovation and entrepreneurship, as well as perspective on the relevancy of these concepts to their future instructional practices as agriculture teachers.

While often involving pre-designed lesson plans and objectives, non-formal learning occurs outside of the rigid and mandated confines of formal learning (Andersson & Andersson, 2005; Etling, 1993). The flexibility that underpins non-formal learning allows for the development of curricula that is highly responsive to the needs and demands of students, as well as community, government, and industry stakeholders (Eraut, 2000). Also, students who engage in non-formal learning are understood to be intrinsically motivated given there are no institutional mandates requiring them to do so. Engagement in non-formal coursework specific to innovation and entrepreneurship provides an indication of the awareness, understanding, and appreciation agricultural education graduate students have for these concepts in relation to their future careers as teachers.

While intentional and learner-directed, informal learning is not pre-designed or structured (Etling, 1993; Hinrichs, Gillespie, & Feenstra, 2004). Such learning occurs through routine and spontaneous interactions, observations, and experiences with not only those in positions of authority (i.e., faculty-student mentoring and coaching), but also with peers. In the context of the current study, I consider how, if at all, graduate student perspectives on the relevancy of innovation and entrepreneurship to agricultural education is shaped and influenced by faculty-to-peer and peer-to-peer interactions, as well as through classroom- and school-based experiences and observations.

Incidental learning is also unstructured, but by definition occurs spontaneously without intention (Marsick & Watkins, 2001). In this regard, the knowledge, insights, and perspectives gained fortuitously through, for example, immersion in the culture of an academic department or professional field, are tacit and thus likely to be taken for granted. However, lessons learned through incidental occurrences are often heightened through eventual experiences to then be more purposefully explored and probed. Incidental learning is an important contributor to the overall socialization process through which graduate students begin to recognize and internalize the values and shared perspectives that shape and guide not only their academic programs of study, but more importantly the professional fields in which they are preparing to enter (Bess, 1978; Van Maanen, 1976). I turn to student reflection on the incidental learning that occurs through the routine and unplanned interactions and experiences inherent to graduate training to develop a greater understanding of how, if at all, innovation and entrepreneurship are introduced and treated as concepts relevant to the work of school-based agriculture teachers.

Methods

General Design

I conducted the current research using a qualitative, multiple case study design. Multiple case study design involves the in-depth comparison of two or more cases that are identified as being directly relevant and informative to the research questions that are being asked (Yin, 2003). Identified cases are framed according to a common set of boundaries (e.g., activity, context, time, place), which brings consistency and parity to the study (Creswell, 2009; Miles & Huberman, 1994). A primary advantage of multiple case study design is the opportunity for achieving greater analytical depth and breadth through the exploration of a single phenomenon across various settings that share common characteristics (Stake, 2006). Here, I explore how, if at all, graduate students preparing to be agriculture teachers, or further preparing in the case of experienced teachers who have returned to graduate school, at three different universities come to understand and view innovation and entrepreneurship in relation to school-based agricultural education. I aimed to enhance the transferability of the results to the broader field of agricultural education by capturing a perspective that extends beyond the limits of an isolated agricultural education graduate program and university setting (Lincoln & Guba, 1985). Human subject protection protocols were fully followed.

Site Selection

I selected agricultural education graduate programs at three different universities as the sites in which to conduct this study. These sites were purposefully selected using the following three criteria provided by Miles and Huberman (1994): appropriateness of setting, presence of events or processes relevant to the phenomenon of focus, and access to key informants. First, each of the three sites are considered to be a suitable settings based in part on being housed in a land grant university (LGU). LGU's are the most appropriate university-type setting for this study due to being the primary institutional homes to agriculture colleges, as well as universities that maintain both a deep tradition of research and contemporary role in the entrepreneurial transfer of innovation (Mars, 2014). The decision to limit the sites to LGUs due to institutional characteristics of innovation and entrepreneurship is also consistent with the premises of theoretical-based selection (Onweuegbuzie & Leech, 2007). Second, the three selected sites enroll graduate students preparing or further preparing to be agriculture teachers. Third, each site was contacted and adequate access to key informants (i.e., graduate students training to be agriculture teachers) and necessary supporting data (e.g., program descriptions) was determined to be a feasible expectation prior to the initiation of data collection.

The goal of qualitative research is not to develop broad claims of generalizability, but instead achieve the capacity to transfer the insights gained to settings beyond those included in a particular study (Merriam, 2009). The inclusion of setting variation is one strategy for achieving transferability (Patton, 2002). In this regard, I use geographic diversity across the selected sites to enhance the transferability of the findings. In particular, I purposefully selected LGUs located in different regions of the country in order to more closely align the design with the previously described national policy emphasis on innovation and entrepreneurship. Secondarily, the inclusion of geographically dispersed sites helps reflect, at least in part, the national landscape of the American agricultural education field. I refer to each of the three selected sites using the following pseudonyms: Western University (WU), Midwestern University (MU), and Eastern University (EU).

Participant Sampling

Graduate students preparing or further preparing to be school-based agriculture teachers are the empirical focus of the study. For purposes of clarity, participants without school-based experience or experience limited to student teaching are heretofore referred to as “emergent agriculture teachers,” while those with professional teaching experience are referred to as “advancing agriculture teachers.” The decision to focus on graduate students was based on the assumed likelihood that most of the participants recruited into the sample would have some experience teaching in a school-based classroom. Focusing on graduate students with some level of teaching experience brings greater depth to participant perspectives on how, if at all, innovation and entrepreneurship might align with school-based agricultural education and subsequently student learning and development. Eighteen of the 21 participants that participated in the study had some level of experience teaching agriculture in a secondary classroom setting. More specifically, six of the participants had between two to eight years of experience working full-time as a school-based agriculture teacher. Twelve other participants had gained classroom experience as a student teacher during their undergraduate programs of study. Three of the participants had no experience working as a school-based agriculture teacher. Two of these three participants did, however, have experience working in Extension education. Lastly, none of the participants had earned undergraduate degrees in agribusiness (or any other business-oriented discipline). However, one participant did supplement his undergraduate degree in animal sciences by earning a minor in agricultural economics.

I recruited the study participants using a maximum variation sampling strategy (Patton, 2002), which was designed to intentionally capture as diverse a range of experiences, perspectives, and understandings specific to innovation and entrepreneurship. This strategy was initiated by department heads and/or graduate directors of the agricultural education departments at each of the three previously identified universities distributing an open invitation to participate in the study to all graduate students preparing or further preparing for careers as agriculture teachers via departmental email listserves. Students interested in participating in the study contacted me directly via email. I provided each interested student with a more detailed description of the study, as well as the human subject protection protocol. I next confirmed with each interested student that they were indeed enrolled in an agricultural education graduate program with the intent of preparing or further preparing for a career as an agriculture teacher. The final sample is by design homogeneous in terms of field of study (i.e., agricultural education) and intended career path (i.e., agriculture teacher). Such homogeneity is desirable when aiming to achieve a sample composed of participants that directly match the purpose of a specific study (Onweuegbuzie & Leech, 2007).

Data Collection and Analysis

Data was gathered primarily through semi-structured interviews conducted individually with each of the 21 participants. The interview protocol was designed to explore the following three areas, which directly reflect the study’s three research questions: (1) the understanding of the meaning of innovation and entrepreneurship, (2) participant perspectives on how the two concepts may shape their professional perspectives and practice as agriculture teachers, and (3) how, if at all, the two concepts have been introduced during their graduate training (formally, non-formally, informally, and/or incidentally). The protocol was piloted with three individuals who were working as agriculture teachers and had recently completed a graduate program in agricultural education at my home institution. The interviews, which lasted between 40 and 75 minutes, were audio recorded and later transcribed verbatim. Secondly, relevant curricular and programmatic documents at the departmental and university levels (e.g., syllabi, course descriptions, workshop descriptions, marketing materials) were collected to expand the scope of the findings and allow for triangulation (Miles & Huberman, 1994; Onweuegbuzie & Leech, 2007).

The data were analyzed both deductively and inductively. Deductively, I relied on a structured coding framework consistent with the recommendations provided by Miles and Huberman (1994). I developed the framework to reflect the previously provided conceptualizations of innovation and entrepreneurship (Baregheh, Rowley, & Sambrook, 2009; Drucker, 2001; Hebert & Link, 1989; Phills, Deiglmeier, & Miller, 2008), as well as the four categories of learning (formal, non-formal, informal, incidental). I also analyzed the data inductively with the goal of illuminating any relevant patterns or trends relevant to the research questions, but not directly shaped by the constructs that composed the conceptual framework (Strauss & Corbin, 1998). I conducted the deductive and inductive analyses at both the idiopathic and nomothetic levels as recommended by Gelo, Braakmann, and Benetka (2008). At the idiopathic level, the analysis revealed patterns and trends specific to individual participants. Analysis at the nomothetic level exposed patterns and trends common across participants and therefore the sample and set of sites.

Positionality, Trustworthiness, and Limitations

As the primary instrument for bringing meaning to qualitative data, the knowledge, experience, and perspective of the qualitative researcher specific to the phenomenon being studied can serve as a vital asset throughout the data collection, analysis, and interpretation processes (Chavez, 2008). Accordingly, I brought depth and richness to study by drawing on the knowledge and insights I have gained throughout my nearly ten years of experience teaching collegiate-level entrepreneurial leadership and innovation courses to students from a wide range of disciplinary backgrounds (including agricultural education graduate students). Furthermore, the development and implementation of interdisciplinary innovation and entrepreneurship curricula and its relevancy to agricultural education is a centerpiece of my research agenda. In short, I brought a highly developed perspective to the study based on the relevancy and extensiveness of my instructional experiences and scholarly expertise. Despite the advantages, this positionality also threatened to bias my analysis. Accordingly, I solicited regular feedback and input regarding my design, analytical approach, and summary of findings with an outside expert with over twenty years of combined experience as both a school-based agriculture teacher and agriculture teacher educator at the collegiate level. Also, I furthered enhanced the trustworthiness of the analysis by triangulating the data gathered through the interviews and from the various documents (Berg & Lane, 2014).

Credibility was established through the identification of patterns and trends at the individual participant and sample levels (idiographic and nomothetic analysis) (Gelo, Braakmann, & Benetka, 2008). I also relied on an audit trail to bring greater dependability and conformability to the study. The process underlying this trail involved systematically keeping, organizing, and reviewing the notes pertaining to the selection of the site, recruitment of participants, collection and analysis of the data, and the regular feedback and input provided by the preceding agricultural education expert (Lincoln & Guba, 1985).

Findings

Participant Understanding of Innovation and entrepreneurship

The participants across all three university-sites conveyed a common understanding of entrepreneurship that centered on a narrow set of practices specific to small business development and family enterprise. The following definition provided by Allison, an EU student, embodied the understanding of entrepreneurship generally expressed across the sample: "I think of entrepreneurship as being more small scale business for some reason, kind of like taking the lead to start a business or engage in some activity to make money." Kurt, a MU student, associated entrepreneurship with, "business creation, business development, business management, and things

[activities] such as that done for profit. I think mostly of small business owners and families who run their own businesses as good examples [of entrepreneurship].” Similarly, Carrie, a SU student, defined entrepreneurship as a process involving, “people and families who do not want to work for others and see an opportunity to make money on their own.” None of the study participants made the fundamental connection between entrepreneurship and innovative activities aimed at generating and sustaining wealth and/or community and societal impact.

Overall, the study participants placed entrepreneurship in the context of agriculture in ways consistent with the preceding emphasis on small business and family enterprise development. For example, Bill, a MU student, described entrepreneurship as involving the development of “a business model, and finding a way to profit on a product, which I think a lot of farmers sometimes struggle with. They struggle with finding a market to get their products to the people that want them.” Likewise, Carrie, a previously mentioned SU student, indicated, “farming and ranching families need to be able to keep their operations in the black [profitable]. Maintaining an ag business is not easy, so to run one you almost have to be an entrepreneur.” No participant viewed agricultural entrepreneurship in the context of workforce competitiveness.

The participants consistently identified creativity and novelty as the central features of innovation. Mary, an MU graduate student, captured the understanding of innovation consistently expressed across the sample when stating, “innovation is finding a need, finding a niche. Fulfilling it in a unique and creative way.” Similarly, Kelly, another MU student, described innovation as a process that involves “pushing yourself to step outside of what you know and doing things differently.” Moreover, Allison, a previously referenced EU student, described innovation as, “creating something new or being on the cutting edge of a new technology or a new approach to something.” Kurt, a previously mentioned MU student, stated,

I think innovation has a lot to do with uniqueness in your ideas. It's trying something that hasn't maybe been done before, or modifying something in a more significant way to make it better. It doesn't mean it's always successful, it just means you tried to innovate and do something in a new way, and the results of that.

The perspectives shared by Mary, Kelly, Allison, and Kurt are representative of how the study participants overall limited their perspectives of innovation to creativity and novel activities.

Also largely missing from the sample-wide perspective on innovation was the contributions to economies, communities, and society that result from innovative activities and initiatives. In fact, only one of the 21 study participants referenced value creation or impact creation when defining innovation. Specifically, Jessica, a SU student, defined innovation as, “a process that involves an idea or product being inserted into a social system with the goal being to create value.” She related the conceptual depth of her definition to a course on innovation she completed as part of her graduate program of study. In describing the course, she stated,

I just finished a leadership course as part of my [graduate] program that was all about innovation development and diffusion. It was a great course. There is so much strategy involved in innovation. It is really important to people who want to change agriculture.

Beyond Jessica’s more detailed description of innovation, the study participants did not articulate innovation as a concept that transcends creativity and novelty to also include the generation of economic value and/or creation of community and societal impact.

By and large, the study participants failed to fully understand and appreciate innovation and entrepreneurship in the contexts of the national policies and strategies that heavily influence contemporary agricultural settings and practices. Furthermore, the participants did not identify

innovation or entrepreneurship as critical components to the development of an agricultural workforce that is competitive at the local, regional, national, and/or global level.

Instructional Perspectives on Innovation and entrepreneurship

The study participants revealed little perspective on how innovation and entrepreneurship may influence their future practices as agriculture teachers. While they did commonly express the importance of agriculture students acquiring basic business management skills (e.g., bookkeeping, sales), none of the participants expressed the perceived need to equip students with the entrepreneurial skills associated with the advancement of innovation. Likewise, the students did not recognize the potential relevancy of linking the scientific and technological topics conventionally taught in the agriculture classroom (e.g., animal and plant systems, technology development and management) with the principles and practices of innovation and entrepreneurship. In this regard, the study participants did not align their perspectives and intended practices as emergent and advancing agriculture teachers with agricultural workforce demands that are being heavily shaped by the knowledge-based economy.

The participants who had some experience working as agriculture teachers prior to entering their graduate programs (i.e., advancing teachers) often associated entrepreneurship with the SAE track in “entrepreneurship and ownership.” Kim, a MU student, used the following example to describe her previous experience supervising entrepreneurship and ownership SAE’s as an agriculture teacher: “Some of them would walk a dog for 25 hours and make that their entrepreneurship experience because they would advertise and they had clients.” Kurt, a previously mentioned MU student, linked student interest and engagement in entrepreneurship and ownership SAE’s with family background. He stated, “The students aren’t necessarily entrepreneurs. It’s more like their families are. I don’t know of any students that I can think of right off that just out right own everything by themselves. It’s always their parents gave them things [SAE project ideas and resources].” Annie, another MU student, echoed the influence of family on student engagement in the entrepreneurship and ownership SAE when stating,

There were some business decisions, I would pull in the parents quite a bit, and we would have a lot of conversations with all three of us to talk about moving forward when they were really serious in it [SAE project], or if they were dealing with more money.

Annie, Kurt, and Kim also did not view innovation as being a necessary component to a meaningful entrepreneurial learning experience. For instance, Annie, the previously mentioned MU student, stated,

We have the ones who are very production-based kids, and they’re the ones who typically do the entrepreneurship piece, it’s usually more traditional. I didn’t have quite as many [students] that would come up with more of the innovative or new ideas. When they were doing entrepreneurship, it was very traditional.

Similarly, Jessica, a previously mentioned SU student, framed her understanding of the entrepreneurship and ownership SAE not in the context of innovation, but more so in relation to business ownership and management. She stated,

In agricultural education there’s this thing called supervised agricultural experiences that provide students with work-based learning opportunities. These experiences can include an entrepreneurial piece. Some students can try to build a herd of cattle, sell calves, etc., but others could be working in a grocery store, which is already a business but it still involves developing business skills. These types of experiences are really affiliated with entrepreneurship.

Overall, the study participants held a narrow view of entrepreneurship that centered on small business and family enterprise development and management, and neglected the inherent importance of innovation to the entrepreneurial process.

Innovation and Entrepreneurship Inclusion in Graduate-level Agricultural Education

Formal Learning. Only three study participants, all of whom were at SU, reported having completed formal coursework at the graduate level specific to innovation or entrepreneurship. These three SU study participants had all completed the same course, which was specific to organizational innovation and diffusion across agricultural settings and environments. One of these participants was Jessica, who was mentioned previously in the paper as having provided a relatively in-depth definition of innovation. In describing how she believed the innovation course would influence her teaching career, she stated, “I can see myself using innovation to change schools and education as a system, but I am not sure if or how I would teach it to students.” Similarly, Barney, another SU student who took the same course commented, “I definitely now know why change in schools is so slow and maybe someday I’ll use the information if I am ever a principal or something like that. But for now, I need to learn to be an effective teacher.” Carrie, the third SU student who completed the innovation course, stated,

It was a fun and eye-opening course, but there was no direct application to teaching. It was mostly focused on how innovation and change occurs in agriculture organizations and business, as well as whole school systems. I am not sure I’ll use the content much as a teacher.

Bill, a previously mentioned MU student, indicated he had completed an entrepreneurship course to satisfy the agribusiness elective requirement of his undergraduate degree. He indicated the content was helpful not to his training and development as an agriculture teacher, but rather in relation to a family cattle business he helped operate. Thus, those study participants who had completed formal coursework in innovation or entrepreneurship did not associate the knowledge gained with their future practices as agriculture teachers.

The potential need for agriculture teachers to have some formal background in innovation and/or entrepreneurship was not fully lost on all of the study participants. In particular, participants with some previous teaching experience involving the entrepreneurship and ownership SAE recognized a need for entrepreneurial training. Annie, a previously mentioned MU student stated,

I think teachers definitely need to be more prepared in the proficiencies [in innovation and entrepreneurship]. I can remember the entrepreneurship [SAE] applications were so much more difficult to fill out within FFA, and a lot of teachers struggle with that. I think that to me, this demonstrates that a lot of them, unless they've had their own businesses or did their own kind of production-type entrepreneurship things - they don't understand a lot of how it [entrepreneurship] really works.

Annie’s comments point to the broader finding that those participants who reported a need for some level of formal training in the area of entrepreneurship did so based on the SAE option and not out of concern over their capacity to prepare students to compete and succeed within agricultural environments that are heavily influenced by the knowledge-based economy.

Non-formal Learning. On one hand, only one of the study participants reported an awareness or interest in non-formal trainings specific to innovation and/or entrepreneurship that may have been hosted outside of their campuses by organizations such as Chambers of Commerce. On the other hand, nearly all of the participants from all three universities indicated an awareness of university-based presentations, workshops, or events (e.g., speaker series) on topics relevant to

innovation and/or entrepreneurship. However, none of the students felt compelled to engage in such non-formal learning opportunities. In fact, overall they viewed the entrepreneurial learning environments of their universities as being mostly irrelevant to the agricultural education field and their intended career paths as agriculture teachers. For example, Fredrick, a EU student, commented, "I see fliers around campus and in the [agriculture] college advertising programs dealing with entrepreneurship. These are for science students and agribusiness students who want to be businesspeople. That is not my thing. I do not pay much attention." These types of university programs were also not promoted by agricultural education faculty, which reinforced the notion of irrelevancy. For instance, Carrie, a previously mentioned SU student, stated,

I know the university puts on a lot of talks and programs on intellectual property protection, business plan development, and other innovation kinds of topics. I have a lot of friends in plant and animal sciences that go to these things because their faculty advise them to do so. Our faculty never mention them, so I do not think going would be a good use of my time.

These comments shared by Fredrick and Carrie are illustrative of an overall sense shared by the study participants that non-formal learning opportunities pertaining to innovation and entrepreneurship are irrelevant to their intended careers as agriculture teachers and thus not worth attending.

Informal and Incidental Learning. The academic training and professional development of graduate students occur not only through formal coursework and faculty mentoring, but also through informally observing and regularly interacting with faculty and peers. Accordingly, the relevancy and connections (or lack thereof) of innovation and entrepreneurship to school-based agricultural education and the agriculture teacher profession could have potentially been observed by the study participants through the day-to-day "work" (e.g., research activities, meetings) and discussions that occurred within the agricultural education departments.

Only the SU students observed activity and discussions within their departments that involved entrepreneurship. These observations were limited to one agricultural education professor who studied entrepreneurial leadership as a mechanism for stimulating change within agricultural communities. The SU students each described a vague awareness of this particular professor's research activity, but were unable to associate this work with their own aspirations as agriculture teachers. In commenting on this professor's research, Jessica stated,

I think he [professor] studies how entrepreneurs improve agricultural communities and organizations, but I have not talked with him about it. I have only overheard him talking about it with another faculty. I should probably read some of his papers!

Similarly, Carrie, another SU student stated,

I am not sure what he [professor] is studying, but I have heard him talking to others in the office about entrepreneurship as a way of changing communities. I don't think he focuses much on schools, so I haven't paid much attention to his research.

Although having observed some departmental activity involving the application of entrepreneurial principles to agricultural settings, neither Carrie nor Jessica sought out connections between this activity and their own academic and professional interests. Equally important, the professor did not engage the students in his research, which may or may not have compelled the students to seek out greater insight on how entrepreneurship might have productively influenced their future instructional approaches and practices as agriculture teachers. Recall also that the study participants at EU and MU reported having observed no informal or incidental learning pertaining to entrepreneurship within their departments. Despite its importance to the contemporary

agricultural economy, the agricultural education departments represented in this study did not model through informal discussions and interactions the importance of entrepreneurship to contemporary agricultural settings, nor its relevancy to school-based agricultural education and the agriculture teacher profession.

Nearly all of the students at all three university-sites described departmental conversations and discussions pertaining to innovation. Such dialogue was generally described as being centered on how departments planned to update curricula (but not to include innovation and entrepreneurship), engage in student recruitment, and increase operational efficiency under increasing university budgetary constraints. In this regard, innovation was positioned as a departmental-centered activity grounded in fiscal realities of higher education rather than as an engrained value of school-based agricultural education as a profession and organizational field.

Recommendations and Conclusion

College and workforce readiness guides the mission of school-based agricultural education. This mission is dependent on not only preparing agriculture teachers, whether at the pre-service stage or beyond, in effective instructional techniques and pedagogical models, but also in the content most relevant to contemporary agricultural workplace settings and environments. The curricular structures of the programs that prepare agriculture teachers largely account for the latter through science- and technology-based coursework (e.g., agricultural mechanics, animal and plant systems, microbiology). As declared by the Smith Hughes Act in 1917 and later stressed by the CAESS in 1988, agriculture teacher educators should also direct their attention to topics that are representative of the economic and social dynamics that shape and influence contemporary agricultural practices, priorities, and strategies at the local, regional, national, and global levels (Aldrich, 1988; True 1929). Presently, innovation and entrepreneurship are among the most prominent of such dynamics as reflected by both national economic policies (Peterson, 2010; Rivera & Alex, 2008) and integral agricultural education initiatives (e.g., Entrepreneurship and Ownership SAE) (Hanagriff, Murphy, Roberts, Briers, & Lindner, 2010; Retallick, 2010). Unfortunately, the study participants indicated an overall lack of understanding of the meaning and significance of innovation and entrepreneurship in relation to the agricultural economy, as well as failed to recognize the relevancy of the two concepts to their future roles as school-based agriculture teachers. Accordingly, it is recommended that innovation and entrepreneurship principles and concepts be infused into the formal curricula that underpin graduate-level agriculture teacher preparation programs. In doing so, the overarching mission of preparing emergent and advancing agriculture teachers to equip their future students with the technical knowledge and leadership skills necessary to be competitive within the contemporary agricultural workforce would be advanced.

One approach to formally introducing emergent and developing agriculture teachers to the principles and practices of innovation and entrepreneurship is through the leadership coursework that is now commonly available within collegiate agricultural leadership and education departments (Mars & Torres, 2014; Mars, 2015). By contextualizing innovation and entrepreneurship in relation to agricultural leadership, the relevancy of the concepts and associated skill sets to the knowledge-based economy, as well as school- and community-based settings, would be illuminated. However, the rigorous structure of graduate programs may prevent the addition of coursework focused specifically on innovation and entrepreneurship to established programs of study. Embedding principles and concepts of innovation and entrepreneurship into existing leadership coursework already included in programs of study represents a viable strategy for overcoming (or at least offsetting) this structural limitation.

Agriculture teacher educators should also consider introducing emergent and advancing agriculture teachers to the relevancy of innovation and entrepreneurship to school-based agricultural education through the promotion of non-formal learning opportunities available within

their colleges and universities. Participation in non-formal programs is by definition optional. Recall that the study participants lacked a general understanding of innovation and entrepreneurship and the potential relevancy of these concepts to school-based agricultural education. As such, the likelihood of emergent and advancing agriculture teachers participating in university-sponsored discussions and events specific to innovation and entrepreneurship is expected to remain low without faculty endorsements. Accordingly, agriculture teacher educators should seek out opportunities to connect agricultural education graduate students with the innovative and entrepreneurial cultures that exist within their universities vis-a-vis non-formal learning programs (e.g., workshops, guest lectures, speaker series). Faculty should also, through the promotion of such programs, illuminate the value of innovation and entrepreneurship in relation to secondary student preparation for college and workforce success in the context of agricultural industries that are now under the direct influence and pressures of knowledge-based economy. By doing so, emergent and advancing agriculture teachers would stand to develop a stronger perspective on and deeper appreciation for how the two concepts relate to their future instructional practices.

I do not contend that the field of agricultural education should make innovation and entrepreneurship a centerpiece of its curricula and academic activities. However, I do urge faculty to seek out opportunities to model academic and professional perspectives and practices that expand the worldviews of emergent and advancing agriculture teachers beyond the conventional boundaries of the field. The informal and incidental interactions with and observations of faculty and peers help shape the professional perspectives of emergent and advancing teachers. Integrating contemporary concepts and topics such as innovation and entrepreneurship into the routine discourse and informal interactions that occur at the departmental level will prompt graduate students to more fully consider the role of school-based agriculture teachers in broader economic and societal contexts.

Lastly, this study focused exclusively on graduate students. Thus, future research that examines the patterns, trends, and opportunities for integrating principles and practices of innovation and entrepreneurial leadership within undergraduate-level agriculture teacher preparation programs is encouraged.

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